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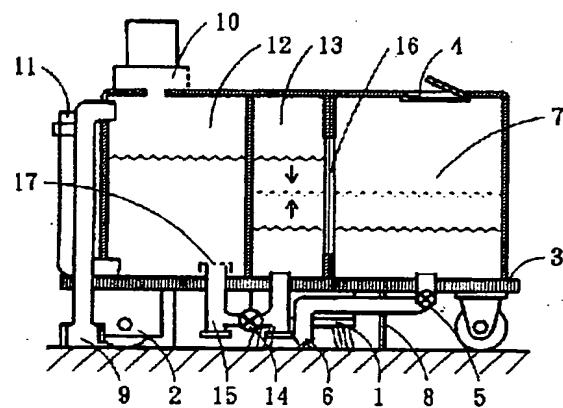
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(54)【発明の名称】床面清掃機

(57)【要約】

【目的】自走する床面清掃機の長時間使用時の清水の補給と汚水の廃棄頻度を少なくし、清掃作業時間の無駄を低減することを目的とする。

【構成】撒水しながらブラシ1を回転して床面を清掃する清掃機本体3上に副水槽13を挟んで清水槽7と汚水槽12を搭載している。副水槽13と汚水槽12の底を閉止弁14を介してパイプ15で連結し、副水槽13と清水槽7との間の隔壁に浸透膜フィルター16を着脱自在に設けている。清水槽7から吐出弁5と吐出口6を経てブラシ1で清掃された汚水は吸込ノズル9から真空ポンプ10で汚水槽12に溜められる。汚水槽12の水位が高くなり閉止弁14を開くと汚水は副水槽13に入り、副水槽13の水位が高くなり浸透膜フィルター16を通して固体物を除かれた汚水が清水槽7に入る。清水と浸透膜フィルター16を通った濁水を混合して洗浄水として使用することができる。



⑩<sup>11</sup>  
substantially  
central position

## 【特許請求の範囲】

【請求項1】台車上の清水槽から吐出弁を介して散水パイプを台車下面に設けた回転ブラシ近傍に導出し、床面の汚水を吸引する吸水ノズルを前記台車上の真空ポンプを有する汚水槽に連結してなる自走の床面清掃機において、前記清水槽に補助水槽を一体に設け、同補助水槽と前記汚水槽の底を閉止弁を介してパイプで連結し、前記補助水槽と前記清水槽との隔壁に浸透フィルターを設けたことを特徴とする床面清掃機。

【請求項2】前記汚水槽側の連結パイプの入口を槽の底面より高く形成し、同連結パイプの入口にフィルターを設けたことを特徴とする請求項1記載の床面清掃機。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は床面清掃機に係り、詳しくは清掃機に搭載した洗浄水の給水頻度の低減及び節水に関するものである。

## 【0002】

【従来の技術】従来の床面清掃機では、図2に示すように、電動のブラシ1と駆動装置2及びバッテリー(図示していない)等を備えた台車3上に給水口4と、吐出弁5及びブラシ1を介して床面への散水パイプ6を有する清水槽7及び床面の汚水を遮蔽板8と集水ガイド(図示していない)を有する吸水ノズル9で集めた汚水を真空ポンプ10で吸込み、排出ホース11より放出する汚水槽12を一体に構成して搭載している。給水場所で給水口4より清水槽7に清水を溜め、汚水槽12を空にして清掃場所に移動し清掃作業を開始する。吐出弁5を開き散水パイプ6より清水を床面に撒水しながら電動のブラシ1を回転し床面を洗浄、清掃する。塵と洗浄水の散逸を防ぐ溜の遮蔽板8と集水ガイドで集めた汚水を吸水ノズル9から真空ポンプ10で吸上げ汚水槽12に溜める。しかしながら、清掃機本体1を大きくできないため清水槽7及び汚水槽12の容量が小さく、清掃中度々給水場所に移動して清水を補給し、汚水を廃棄しなければならなかった。

## 【0003】

【発明が解決しようとする課題】本発明は、上記の問題点に鑑み、床面清掃機の長時間使用時の清水の補給と汚水の廃棄のための頻度を少なくし、清掃作業時間の無駄を減らすことを目的とする。

## 【0004】

【課題を解決するための手段】本発明は、台車上の清水槽から吐出弁を介して散水パイプを台車下面に設けた回転ブラシ近傍に導出し、床面の汚水を吸引する吸水ノズルを前記台車上の真空ポンプを有する汚水槽に連結してなる自走床面清掃機において、前記清水槽に補助水槽を一体に設け、同補助水槽と前記汚水槽の底を閉止弁を介してパイプで連結し、前記補助水槽と前記清水槽との隔壁に浸透フィルターを設けたことを特徴とする。

## 【0005】

【作用】本発明によれば、補助水槽と清水槽の間に浸透フィルターを設けることにより、汚水槽の水位が上がったところで補助水槽と清水槽を連結するパイプの閉止弁を開き、汚水を補助水槽に送り込むことによって補助水槽の水位は清水槽より高くなる。補助水槽で高水位となった汚水は浸透フィルターを通して固体物が除かれ清水槽に移動する。清水と浸透膜フィルターを通った濁水を洗浄水として使用することになる。

## 【0006】

【実施例】本発明の一実施例を図1に基づいて説明する。本実施例は補助水槽に関連する構造のほかは図2に示した従来例と同じなので全体構成の説明は省略する。尚、構成品の番号は同じものについては同一の番号を使用する。駆動装置2を備え自走する床面清掃機の台車3上に補助水槽13を挟んで清水槽7と汚水槽12を一体に構成し、補助水槽13と汚水槽12の底面の間に閉止弁14を介して塵トラップ付のパイプ15を連結している。補助水槽13と清水槽7の間の隔壁に浸透膜フィルター16を着脱自在に設け水の移動を可能にしている。

【0007】本実施例による洗浄水の移動を説明する。清掃作業開始時に給水場所にて給水口4より清水槽7に清水を溜めると浸透膜フィルター16を通して補助水槽13にも清水が溜まり清水の貯水量を増加することができる。清掃作業を続けると、清水槽7と補助水槽13の水位は下がり汚水槽12の水位が上がる。汚水槽12の水位が上がったところでフロートスイッチ等による水位検知を行い、補助水槽13と清水槽7を連結するパイプ15の閉止弁14を開く。汚水を補助水槽13に送り込むことによって補助水槽13の水位は汚水槽12の水位と同じになり、清水槽7より高くなるまでの時間経過により閉止弁14を閉止する。補助水槽13で高水位となった汚水は浸透フィルターを通して固体物が除かれ清水槽7に溜まり、清水と汚水を混合した洗浄水を使用することになる。洗浄水の汚れ具合によって汚水を捨て、清水を給水する。

【0008】また、汚水槽12側の連結パイプ15の入口を槽の底面より高く形成して比重の大きい塵を沈澱させ、連結パイプ15の入口にフィルター17を設け粒度の大きい塵の侵入を防いで補助水槽13へ塵の侵入を抑えている。

## 【0009】

【発明の効果】本発明によれば、補助水槽を設け、補助水槽と清水槽の間に浸透フィルターを設け、さらに、補助水槽と汚水槽の間を閉止弁を介して連結することにより、汚水槽の水位が清水槽の水位より大幅に高くなった時汚水を補助水槽に送り込み、浸透フィルターを通して固体物を除いた汚水を清水槽に返還することができる。清水と浸透膜フィルターを通った汚水を洗浄水として使用することができ、床面清掃機の長時間使用時に清水を

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度々補給するような清掃作業時間の無駄を低減できる。

【図面の簡単な説明】

【図1】本発明の一実施例の床面清掃機の要部縦断面図である。

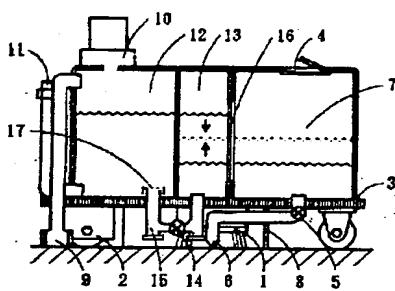
【図2】従来例の床面清掃機の要部縦断面図である。

【符号の説明】

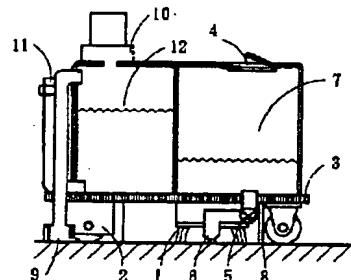
- 1 電動ブラシ
- 2 駆動装置
- 3 台車
- 4 給水口
- 5 吐出弁
- 6 散水パイプ

- 7 清水槽
- 8 遮蔽板
- 9 吸水ノジル
- 10 真空ポンプ
- 11 排水ホース
- 12 汚水槽
- 13 補助水槽
- 14 閉止弁
- 15 連結パイプ
- 16 浸透膜フィルター
- 17 フィルター

【図1】



【図2】



JP 7-31569  
TRANSLATION

D8a

(54) [Title of the Invention]

FITTING STRUCTURE OF EXPANDABLE MATERIAL IN HOLLOW  
STRUCTURE AND FITTING WORKED BODY OF EXPANDABLE MATERIAL

(57) [Abstract]

[Object]

There will be provided a fitting worked body of expandable material for acoustical insulation and vibration damping capable of imparting strength to a hollow structure such as vehicle pillars, and a fitting structure of expandable material.

[Constitution]

The fitting worked body of expandable material comprising a metallic pipe-shaped core member 1 at a substantially central position of an expandable material 2 is fitted with three supporting portions 2B vertically placed on a peripheral wall of an internal pillar portion 12. Thereafter, the internal pillar portion 12 is fixed to an external pillar portion 14 by means of spot welding 17 to assemble the pillar, whereby the fitting structure of expandable material can be obtained. Heating foams the expandable material 2 to fill a hollow portion 16 with foam. Since this foam has, within its central interior, the metallic pipe-shaped core member 1, strength is imparted to the pillar.

[Scope of Claims for Utility Model Registration]

[Claim 1]

A fitting structure of expandable material which is arranged in a hollow portion of a hollow structure, is foamed and contains a core member for reinforcement to form foam for

blocking up the hollow portion, characterized in that the expanded material is attached to an outer side of a core member having stiffness and resistance to heat extended in a direction of a length of the hollow structure, and the core member is inserted into the hollow portion and supported so as to be positioned at a predetermined position within the hollow portion.

[Claim 2]

A fitting worked body for fitting, to a hollow portion, an expandable material which is arranged in a hollow portion of a hollow structure, is foamed and contains a core member for reinforcement to form foam for blocking up the hollow portion, characterized in that the expanded material is attached to an outer side of a core member having stiffness and resistance to heat corresponding to a direction of a length of the hollow structure, and when the core member is inserted into the hollow portion, the expandable material is provided such that the core member is positioned at a predetermined position within the hollow portion.

[Brief Description of the Drawings]

Fig. 1 is a sectional view showing a fitting structure of expandable material according to a first embodiment;

Fig. 2 is a structural view showing a fitting worked body of expandable material according to the first embodiment;

Fig. 3 is a state view showing foam with which a hollow portion of a pillar is filled in the first embodiment;

Fig. 4 is a sectional view showing a fitting structure

of expandable material according to a second embodiment;

Fig. 5 is a structural view showing a fitting worked body of expandable material according to the second embodiment, and

Fig. 6 is a sectional view showing a conventional state of fitting of an expandable material.

[Description of Symbols]

- 1: Core member,
- 2: Expandable material,
- 2B: Supporting portion,
- 3: Core member,
- 4: Expandable material,
- 5: Supporting portion,
- 16: Hollow portion

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to an fitting structure of expandable material in a hollow structure and a fitting worked body of the expandable material, and more particularly to a fitting structure of expandable material which is arranged at a predetermined position within a hollow structure such as a vehicle pillar, is foamed at that position and an hollow portion is blocked up to exhibit effects of acoustical insulation, vibration damping and the like, and a fitting worked body of the expandable material, further capable of imparting strength to the hollow structure.

[0002]

[Prior Art]

In a conventional fitting structure of this sort of expandable material, there is brought about a state in which an expandable material 10 is inserted to a screw 11 inserted through from an outer side of an internal pillar portion 12, through a washer 15, in a hollow portion 16 to be formed by the internal pillar portion 12 and an external pillar portion 14 as shown in Fig. 6, and the expandable material 10 has been fixed by means of the screw 11 inserted through from the outer side of the internal pillar portion 12. The expandable material 10 fixed is foamed by means of heating from outside to fill the hollow portion 16 within the pillar, and foam with which the hollow portion 16 is filled is caused to impart acoustical insulation and vibration damping effects to the pillar.

In this respect, in Fig. 6, a reference numeral 13 designates a bolt tightening portion for installing and fixing the internal pillar portion 12 to the external pillar portion 14.

[0003]

[Problems to be solved by the Invention]

In the conventional expandable material 10, however, merely the screw 11 has been inserted at the central portion, and when it foams by means of heating, the foam with which a hollow portion 16 within the pillar is filled has had too low strength to impart sufficient strength to the hollow structure such as the pillar.

It is a problem of the present invention to provide a fitting structure of expandable material capable of imparting strength to the hollow structure such as a vehicle pillar as well as effects of acoustical insulation, vibration damping and the like, and a fitting worked body of the expandable material required to adopt the structure.

[0004]

[Means for solving the Problems]

In order to solve the above-described problem, there is provided fitting structure of expandable material according to the present invention which is arranged in a hollow portion of a hollow structure, is foamed and contains a core member for reinforcement to form foam for blocking up the hollow portion, characterized in that the expanded material is attached to an outer side of a core member having stiffness and resistance to heat corresponding to a direction of a length of the hollow structure, and the core member is inserted into the hollow portion and supported so as to be positioned at a predetermined position within the hollow portion, and a fitting worked body for fitting, to the hollow portion, expandable material according to the present invention which is arranged in a hollow portion of a hollow structure, is foamed and contains a core member for reinforcement to form foam for blocking up the hollow portion, characterized in that the expanded material is attached to the outer side of a core member having stiffness and resistance to heat corresponding to the direction of the length of the hollow structure, and when the core member is inserted into

the hollow portion, the expandable material is provided such that the core member is positioned at a predetermined position within the hollow portion.

[0005]

[Operation]

According to the fitting worked body of expandable material and the fitting structure of expandable material having the above-described structure, when the expandable material is foamed by means of heating, strength is imparted to the hollow structure because the foam with which the hollow portion of the hollow structure is filled has a core member having stiffness corresponding to the direction of the length of the hollow structure inside.

[0006]

[Embodiments]

First Embodiment

With reference to Figs. 1 to 3, the description will be made of the first embodiment of the present invention.

Fig. 1 is a view showing the fitting structure of expandable material according to the present embodiment 1 in which a fitting worked body of expandable material according to the present embodiment 1 has been installed within the hollow portion 16 within the vehicle pillar, showing a state in which the expandable material has not yet been foamed before heated.

The fitting worked body of expandable material according to the present embodiment 1 comprises an expandable material 2 applied in strata to the outer side of a metallic, pipe-shaped

core material 1 as shown in Fig. 2. This core member 1 and the expandable material 2 are made integral with each other when the expandable material 2 is formed. The expendable material 2 is formed in a circular layer portion 2A having a fixed wall thickness over the entire outer circumference of the core member 1, and into a shape in which at a position that comes into perpendicular contact with the hollow portion 16 of the vehicle pillar, a rectangular parallelopiped-shaped supporting portion 2B is projectingly provided at four places. The length of the cylindrical column-shaped core member 1 can be caused to coincide with the length of a pillar to which the fitting worked body of expandable material according to the present embodiment 1 is fitted, or a plurality of core members 1 having a shorter length than the length of the pillar can be continuously attached in the direction of the length of the pillar for use. If the pillar is not straight line-shaped, the latter use method can be adopted.

[0007]

In the fitting structure of expandable material according to the present embodiment 1, in which the fitting worked body of expandable material according to the present embodiment 1 has been fitted within the hollow portion 16 of the vehicle pillar, it is heated from the outside to foam the expandable material 10. A state in which foam produced fills the hollow portion 16 of the pillar to harden is as shown in Fig. 3. Fig. 3 shows a state in which the hollow portion 16 of the vehicle pillar has been filled with hardened foam between

the core member 1 and the walls within the hollow portion 16.

The interior of the hollow portion 16 of the pillar can be all filled with the foam, or it can be partially filled, and in both cases, the foam is to block up the hollow portion 16 of the pillar.

[0008]

#### Second Embodiment

Next, with reference to Figs. 4 and 5, the description will be made of the second embodiment according to the present invention.

Fig. 4 is a view showing the fitting structure of expandable material according to the present embodiment 2 in which the fitting worked body of expandable material of the present embodiment 2 has been fitted to the hollow portion 16 within the vehicle pillar, showing a state in which the expandable material before heating has not yet been foamed.

The fitting worked body of expandable material according to the present embodiment 2 is such that, as shown in Fig. 5, on the outer surface of a metallic core member 3 extended in the direction of the length of which the cross section is H-shaped, the expandable material 4 is fitted in strata. This core member 3 and the expandable material 4 have been made integral with each other when the expandable material 4 is formed. The expandable material 4 is formed at a fixed wall thickness over the entire outer surface of the metallic core member 3 of which the cross section is H-shaped, and its entire cross section is substantially H character-shaped with the metallic core

member 3 being centered. In other words, the expandable material 4 is composed of two rectangular parallelopipeds, which have plate-shaped plane portions 4A and 4A at substantially parallel positions, and have a pillar portion 4B of the parallelopiped substantially perpendicularly to the plane portions 4A and 4A between these plane portions 4A and 4A and continuously. The plane portion 4A is continuously provided with a supporting portion S protruding outwardly from the core member 3, and when this fitting worked body has been fitted to the hollow portion 16, the core member 3 is adapted to be disposed at a predetermined central position. In this respect, the supporting portion S may be provided along the direction of the length, or may be partially provided. The length of the core member 3 in the direction of the length may be caused to coincide with the length of a pillar to which the fitting worked body of expandable material according to the present embodiment 2 is fitted, or a plurality of core members 3 having a shorter length than the length of the pillar may be continuously attached in the direction of the length of the pillar for use. If the pillar is not straight line-shaped, the latter use method can be used.

For the expandable material 2 and 4 according to the present embodiment 1 and the present embodiment 2, a compounding material specified in Japanese Published Unexamined Application No. 2-276836 has been used. This material is characterized in that it can be foamed and hardened at the same time at a temperatures of 110 °C to 190 °C, and to produce closed

cell foam. In this respect, for the expandable material, foam which foams by means of external heating can be widely adopted.

[0009]

When fitting a fitting worked body of expandable material according to the present embodiment 1 or the present embodiment 2 to the hollow portion 16 of the vehicle pillar, after the supporting portion 2B or the supporting portion S is placed at a predetermined position on the internal pillar portion 12, the internal pillar portion 12 is fixed to the external pillar portion 14 by spot welding 17 to assemble the pillar. Thereby, the fitting structure of expandable material according to the present embodiment 1 or the present embodiment 2 can be obtained.

In the case of this fitting, in the fitting worked body of expandable material according to the present embodiment 1, if three supporting portions 2B are placed in the direction perpendicular to a peripheral inner surface of the internal pillar portion 12, or in the fitting worked body of expandable material according to the present embodiment 2, if two supporting portions S at both ends of the same plane portion 4A are placed on the bottom surface of the internal pillar portion 12, the core member 1 or the core member 3 will be positioned at the central position of the hollow portion 16.

In this respect, as regards positioning of the core member 1 or the core member 3, a magnet piece may be attached onto the expandable material 2 or the expandable material 4 in advance to magnetically attach to the internal pillar portion 12, or as in the past, a bolt may be used to fit the circular layer

portion 2A or the plane portion 4A onto the internal pillar portion 12. In this case, there is no need for provision of the supporting portion 2B or the supporting portion S, and the core member 1 and the core member 3 can be provided at a substantially central position of the hollow portion 16 of the pillar in an extended state in the direction of the length. Thereafter, similarly the internal pillar portion 12 is fixed to the external pillar portion 14 by spot welding 17 to thereby assemble the pillar.

[0010]

The expandable materials 2 and 4 according to the present embodiment 1 and the present embodiment 2 are shaped such that when the pillar has been assembled, the supporting portion 2B and the supporting portion S of the expandable materials 2 and 4 come into direct contact with the peripheral metallic wall in the hollow portion 16. Accordingly, there is an advantage that heat by heating from the outside is prone to be conducted to the expandable materials 2 and 4.

[0011]

The expandable materials 2 and 4 according to the present embodiments 1 and 2 foam by means of heating to fill the hollow portion 16 within the pillar, whereby effects of acoustical insulation, vibration damping and the like are imparted to the pillar. Since this foam is caused by heating (about 160 °C) during painting by heating of the vehicle, there is no need for provision of any heating process, and it is convenient.

Since the fitting worked body of expandable material

and fitting structure of expandable material according to the present embodiments 1 and 2 after foaming have the core member 1 and the core member 3 having stiffness extended in the direction of the length of the pillar within the expandable materials 2 and 4 respectively, strength is imparted to the pillar. Further in this state, the core member 1 and the core member 3 exist at a substantially central position of the hollow portion within the pillar, and therefore, strength is more effectively imparted to the pillar due to the core member 1 and the core member 3.

In this respect, in the present embodiment, the description has been made of a case where the fitting worked body of expandable material according to the present invention is used for the vehicle pillar, but it is possible to use the fitting worked body of expandable material according to the present invention for the hollow portion of another hollow structure in addition to the vehicle pillar, to obtain the fitting structure of expandable material according to the present invention, and to cause expandable material to foam by heating for obtaining effects of the acoustical insulation, vibration damping, waterproofing and the like.

[0012]

#### [Effect of the Invention]

According to the fitting worked body of expandable material and the fitting structure of expandable material of the present invention, since an expandable material has been fitted on the outer side of the core member having stiffness

and resistance to heat extended in the direction of the length of the hollow structure, when the expandable material is caused to foam by heating, it is possible to obtain effects of the acoustical insulation, vibration damping, waterproofing and the like due to foam with which the hollow portion within the hollow structure is filled, and strength is imparted to the hollow structure due to the core member having stiffness extended in the direction of the length of the hollow structure.

Docket # 2641/207-168

Applic. # 09/666,951

Applicant: BECKMANN

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